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# Stormwater 201 – Water Quality Program

Presented to the Joint City-County Planning Committee  
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# Acronyms, Abbreviations

Best Management  
Practice (BMP)

Council of Governments  
(COG)

NC Division of Water  
Quality (DWQ)

US Environmental  
Protection Agency (EPA)

Environmental  
Management Commission  
(EMC)

US Geological Survey  
(USGS)

Geographical  
Information Systems  
(GIS)

Illicit Discharge  
Detection and  
Elimination (IDDE)

Municipal Separate  
Storm Sewer System  
(MS4)



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# More Acronyms, Abbreviations

New Employee Training  
(NET)

National Pollution  
Discharge Elimination  
System (NPDES)

Nutrient Sensitive Water  
(NSW)

Superfund Amendments  
and Reauthorization Act  
(SARA)

Stormwater Pollution  
Prevention (SWPP) Plans

Total Maximum Daily  
Load (TMDL)

Water Reclamation  
Facility (WRF)

Total nitrogen (TN)

Total phosphorus (TP)

North Carolina List of  
Impaired Waters (303(d)  
List)



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# Stormwater Quality Regulations

City Stormwater Pollution Control Ord.

City/County Unified Development Ord.

State Erosion and Sediment Control Prog.

State Nutrient Sensitive Waters Rules (NSW)

State Water Supply Watershed Program

Federal Total Maximum Daily Loads (TMDLs)

Federal National Pollutant Discharge Elimination System (NPDES) Permits – Municipal & Industry



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# Cooperating Agencies and/or Partners

## ■ Within the City

- Water Management
- Planning Department
- Solid Waste Management
- Parks and Recreation
- Durham Housing Authority

## ■ External

- Durham County Health Department
- Durham County Soil and Erosion
- Friends of the Eno
- Ellerbe Creek Watershed Association
- Upper Neuse Basin Association



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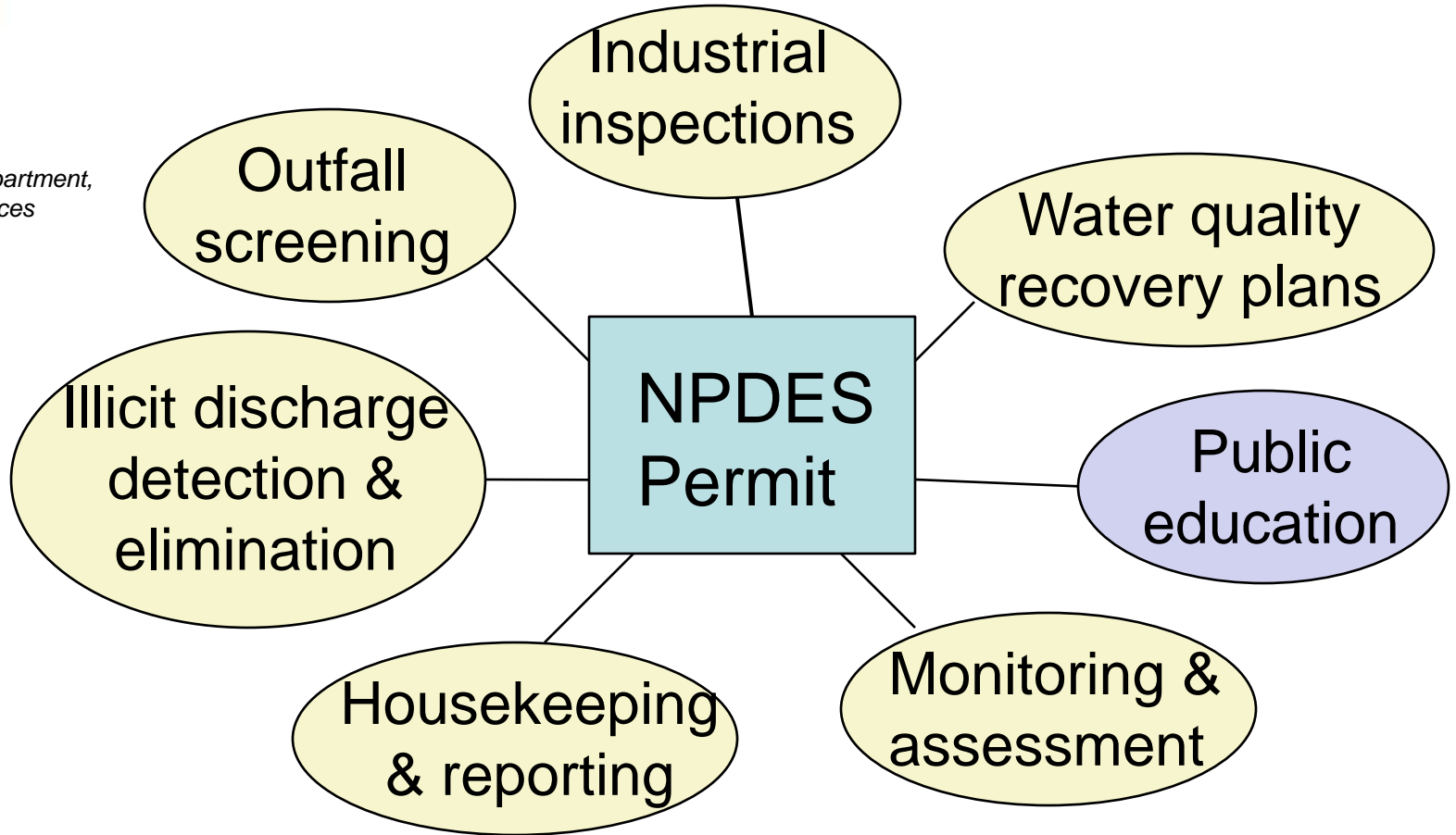


# Cooperating Agencies and/or Partners, cont.

- Triangle J COG
- Ecosystem Enhancement Program
- Clean Water Management Trust Fund
- Water Resources Research Institute
- NC State University
- NC Central University
- Duke University
- NC Division of Water Quality (DWQ)
  - Raleigh Regional Office
  - Modeling & TMDL Unit
  - Biological Assessment Unit
  - Stormwater and General Permits Unit
  - Basinwide Planning Unit



# What's required in the municipal NPDES Permit?





# Stormwater pollutants

- Sewage
- Automotive fluids
- Sediment from erosion
- Car wash runoff
- Food, cooking oil, grease
- Pet waste
- Pollutants from vehicle exhausts
- Leaves & other yard wastes
- Litter
- Fertilizer, pesticides, herbicides
- Paint, solvents
- Other hazardous wastes





# Illicit Discharge Detection and Elimination (IDDE)

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270

Average number  
of investigations  
per year



Sewer Overflows

Discharge  
collected &  
pumped back into  
system



Failing septic systems



Broken house sewer  
Repaired

Sewage



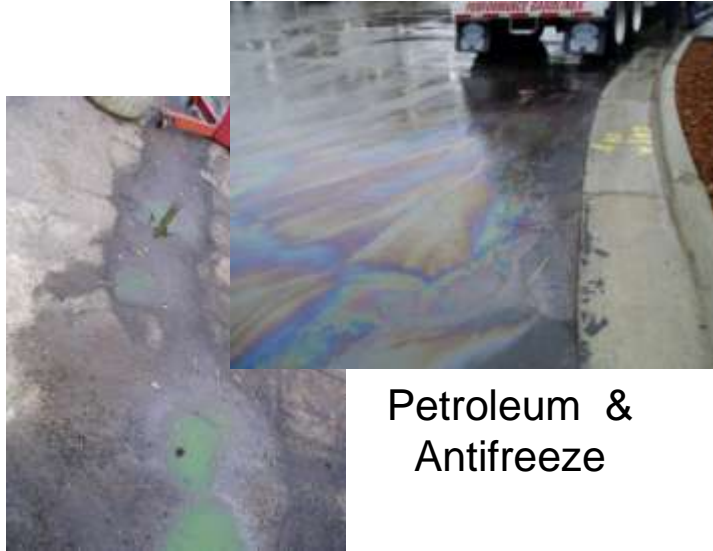
# Illicit Discharge Detection and Elimination (IDDE)

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3241

Total investigations  
in 12 years



Petroleum &  
Antifreeze

Automotive  
Fluids &  
Commercial  
Vehicle Washing



Vehicle wash pad



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133

Sources  
controlled in FY07

# Illicit Discharge Detection and Elimination (IDDE)



- Yard Wastes
- Paint
- Grease & Food Wastes







# Illicit Discharge Detection and Elimination (IDDE)

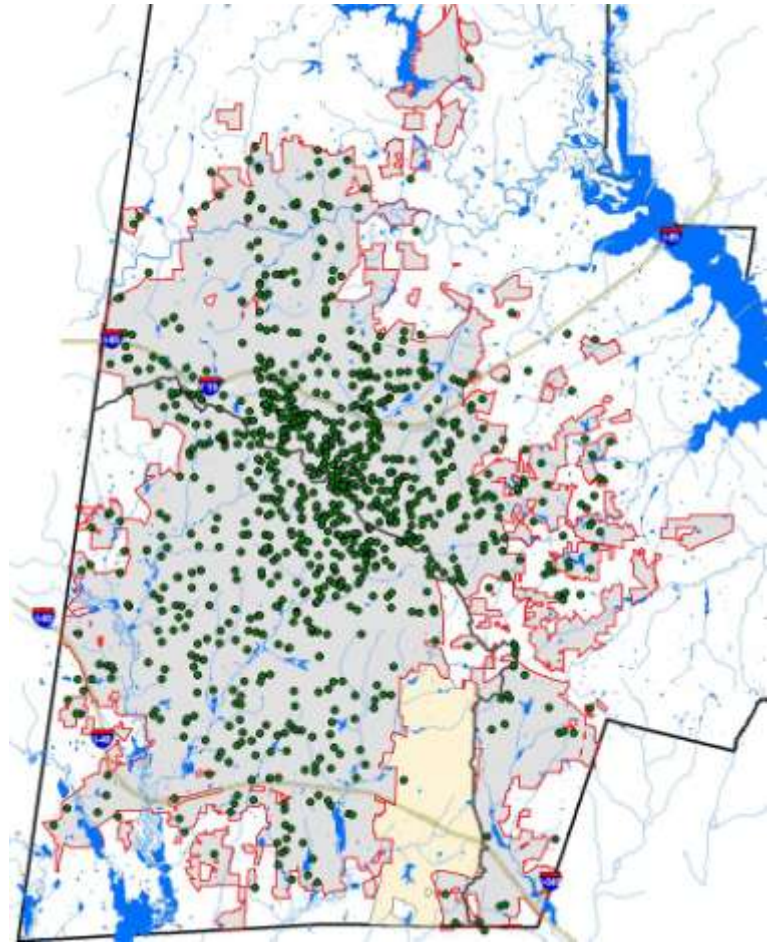
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1185

Investigations  
2002 to present

- Investigations have blanketed the City
- High concentration of investigations in areas of older development





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# Outfall Inspection & Screening

- Objectives:
  - Inspect stormwater system for maintenance
  - Identify & eliminate illicit discharges and major outfalls
- Permit requires city to inspect & maintain the MS4
- Discharges that occur during dry weather may carry pollutants



*Major stormwater outfalls: 890  
All outfalls in industrial areas*



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# Outfall Inspection & Screening

Inspect for evidence of pollution

- Odor, color, turbidity, floatables
- Staining, excess algae

At Outfalls with flow during dry weather, monitor indicators of pollution

- Flow, pH, temperature, turbidity, DO
- Ammonia, chlorine, conductivity, potassium
- Other indicators as needed: copper, detergents, phosphate, nitrate, phenols



*Major stormwater outfalls: 890*  
*All MS4 outlets: 3,185*  
*All Private outlets: 6,140*



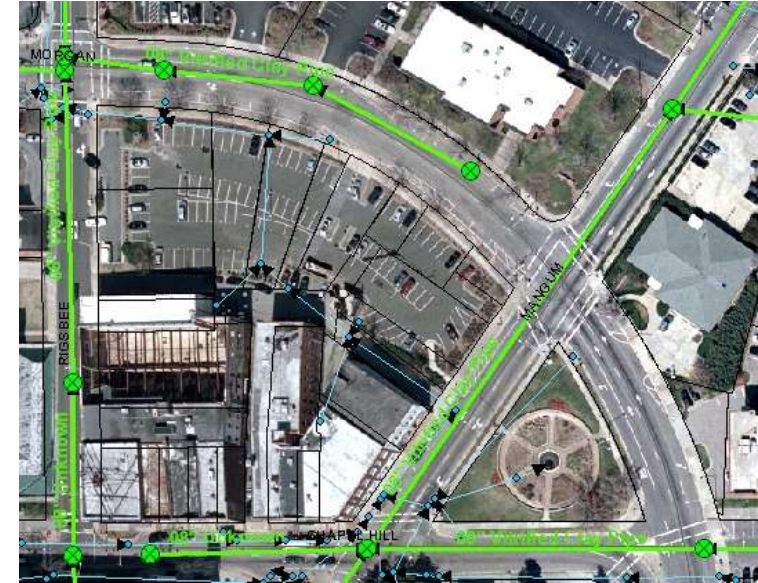


# Outfall Inspection & Screening

When a dry weather flow contains indicators, the source must be found and eliminated

- GIS maps of the storm drain system used to assist investigation
- Industrial facilities have been mapped
- Most locations where sanitary sewer crosses over storm drain have been mapped.

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*Estimate of outfalls requiring screening: 1,200*



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# Industrial inspections

- Priorities for inspection, facilities that:
  - Have reported environmental releases
  - Have (or should have) NPDES Industrial Stormwater Permits
  - Have had prior illicit discharge enforcement
  - Are in certain categories where problems have been frequent







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# Facilities Reporting Releases To The Environment

Reporting of toxics released to environment is required by Section 313 of Title XI1 of the Superfund Amendments and Reauthorization Act of 1986 (SARA)

- Toxic release data available by county from EPA
- In latest reporting year only 14 facilities reported releases (compared to 42 since 1986)
- 9 of 14 facilities were found to be at least partly in the City
- All nine facilities in City were inspected during the last two years



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# Categories Requiring NPDES Industrial SW Permits

- Transit & Transportation
- Used Motor Vehicles (Junkyards)
- Wastewater Treatment Plants
- Mining
- Metal Fabrication
- Printing
- Stone, Clay, and Glass Processing
- Food Service
- Landfills
- Recycling
- Ready Mix (Concrete)
- Chemical manufacturing
- Pharmaceuticals
- Groundwater Remediation

Currently **74** facilities have either permits or non-exposure certificates; City continues to identify and add Facilities from these categories

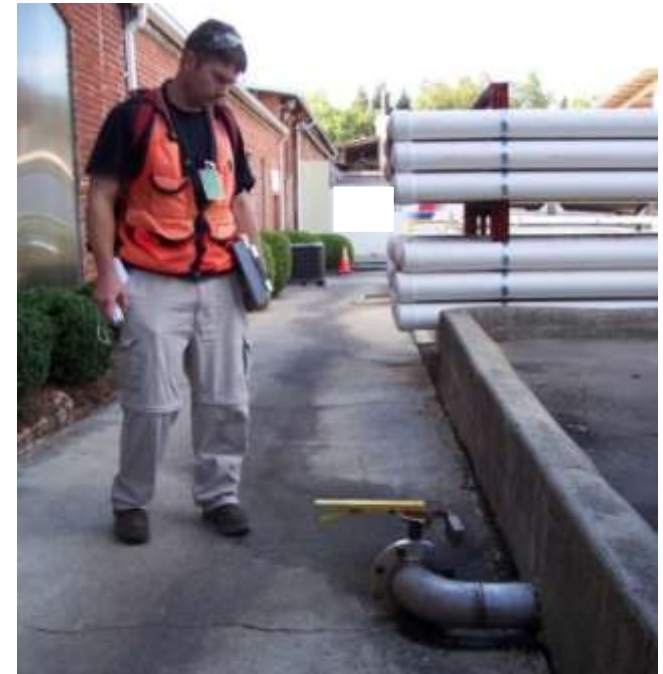


57

Inspections of  
Private industries  
in FY07

# Industrial inspections

- Inspection database:
  - Private facilities reporting environmental releases:
  - Facilities with NPDES Industrial Stormwater Permits
  - Facilities required to develop SWPPs because of prior enforcement
  - Facilities in categories where problems have been frequent



172+ Industries



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# City Pollution Prevention and Good Housekeeping

- Hotspot facility management
- Street sweeping
- Residential stewardship
- Employee training
- Storm drain maintenance
- Stormwater hotline response
- Street repair and maintenance
- Park and landscape maintenance
- Construction project management
- Maintain City's BMPs (8+)



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Inspections  
of City  
Hotspots (FY07)

# City Hotspot Management

## Facilities with permits or Stormwater Pollution Prevention Plans (SWPPPs)

- South Durham WRF
- North Durham WRF
- Fleet Maintenance
- Public Works Operations Center
- Solid Waste Vehicle Wash
- DATA Bus Maintenance (private operator)
- Solid Waste Transfer Station
- General Services Center



SWPPPs detail how  
spills and leaks are to  
be cleaned



# City Pollution Management

## Street Sweeping

- City uses high-efficiency vacuum street sweepers
- Cleaned 13,483 Curb miles
- Collected 3,017 tons of pollutants & debris
- Manual pickup collected 420 tons more

## Household Hazardous Waste Collection

- Open 4 days/week
- Collected 426,342 pounds
- Recycled 93%

Street  
sweeping  
photo

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# City Pollution Prevention and Good Housekeeping

- Employee Training
  - New Employee Training NET
  - Police NET training
  - Training at hotspot facilities
- Storm drain maintenance (FY08)
  - Inlets cleaned: 427
  - Pipe cleaned: 17,596 ft
  - Street ditching: 115,459 ft
- Maintain City's BMPs
  - 3 existing, 1 in planning





# TMDLs are coming!

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Stormwater  
Permittees







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# What is a TMDL?

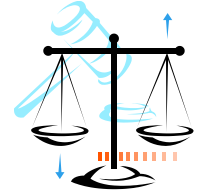
TMDL has two meanings:

1. Literal meaning: **Total Maximum Daily Load** is the pounds of pollutant that a water body can receive without exceeding Water Quality Standards ("maximum allowable load").
2. Regulatory meaning: TMDL is a "pollutant budget" that allocates the maximum load of definition 1 to its sources.

The TMDL that must be submitted by the state to EPA is the "pollutant budget" which is based on the maximum allowable load.



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## Permit requirements

“Reduce levels of the pollutant of concern in discharges from the MS4 in accordance with the permittee’s assigned MS4 waste load allocation in approved **Total Maximum Daily Loads.**”

- Establish a water quality recovery plan
- Recovery plan designed to meet TMDL requirements
- Where rulemaking is underway to implement provisions of a regional TMDL, the schedule and requirements in the rules are deemed to comply.



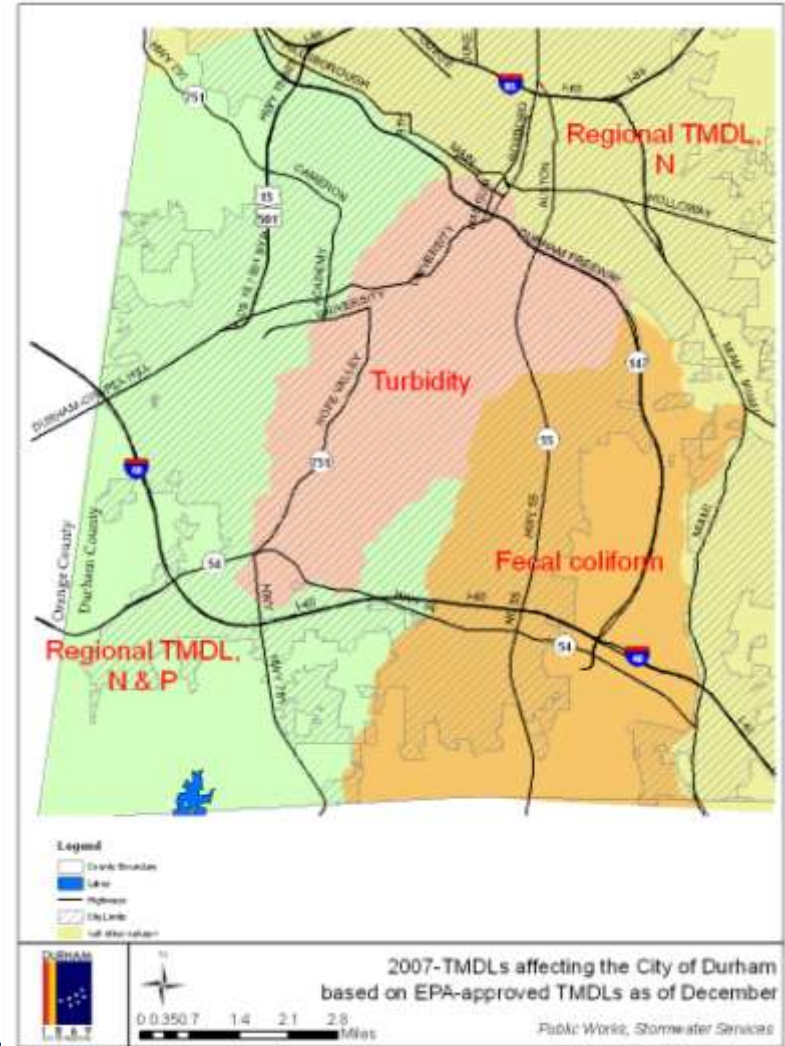
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# TMDLs are coming! (They're here)

Water Quality  
Recovery Plans are  
required if state rules  
are not in place.

Nitrogen control  
everywhere.







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# Water Quality Recovery Plans

ID City outfalls that may contribute to problem

Develop a monitoring plan for problem

Assessment of the effectiveness of existing management practices

Assessment of additional management practices needed

Schedules for all components, including installation or implementation of management practices

Annual reporting





# Monitoring and Assessment

- Required by federal permit
- **Accountability!**

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Chemistry - Aquatic life – Flow



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# What does monitoring tell us?

- Is water quality meeting state standards?
- Does the stream support a good biological community?
- Is water quality getting better or worse?
- Where are the problem areas?
- What types of sources may be contributing?





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# Monitoring Programs

- Completed monitoring
  - Land use characterization
  - End-of-Pipe screening of dry weather flows
- Ongoing, stream-based monitoring
  - Biological assessment
  - Chemistry
  - Stream flow
  - Long-term, intensive





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# Water Chemistry Monitoring

- **Monitor 45 sites monthly**
- **Variety of parameters, including nutrients, conventional pollutants & metals**
- **South Durham WRF laboratory performs most analyses**



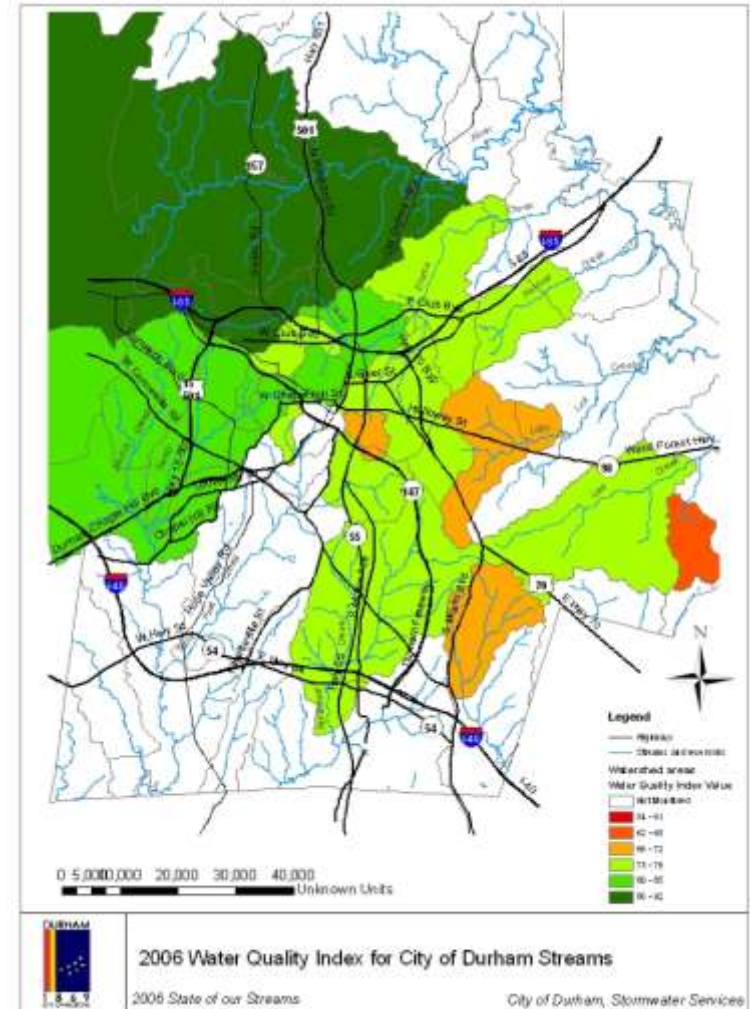


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# Water Quality Index

- Water Quality Index applied city-wide
- Provided to public annually in State of Our Streams report
- Constituents include:  
Fecal coliform bacteria,  
dissolved oxygen,  
nitrogen, phosphorus,  
turbidity, copper, zinc



# Biological Assessment



- Uses benthic macroinvertebrates
- Sensitive – finds more impaired streams than does chemical monitoring
- Integrates inputs

1,250

*Miles of streams  
and rivers*



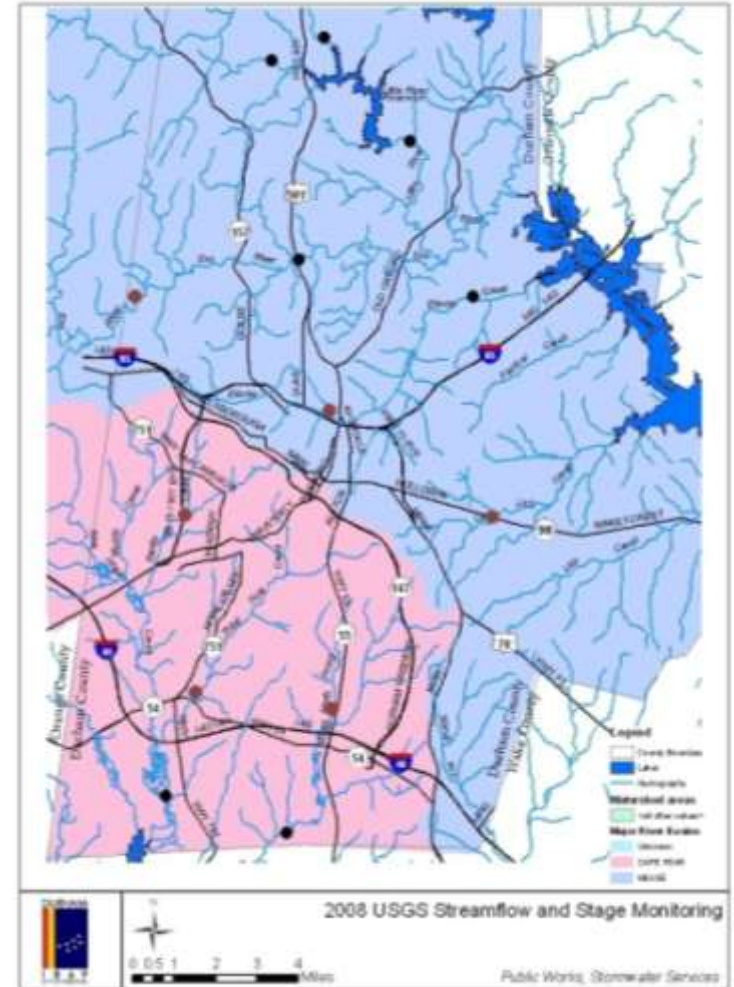


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# Precipitation and Streamflow Network (2008)

- Contract with US Geological Survey
- 6 stations to monitor stream stage. 3 stations also monitor stream flow.
- Available on the internet





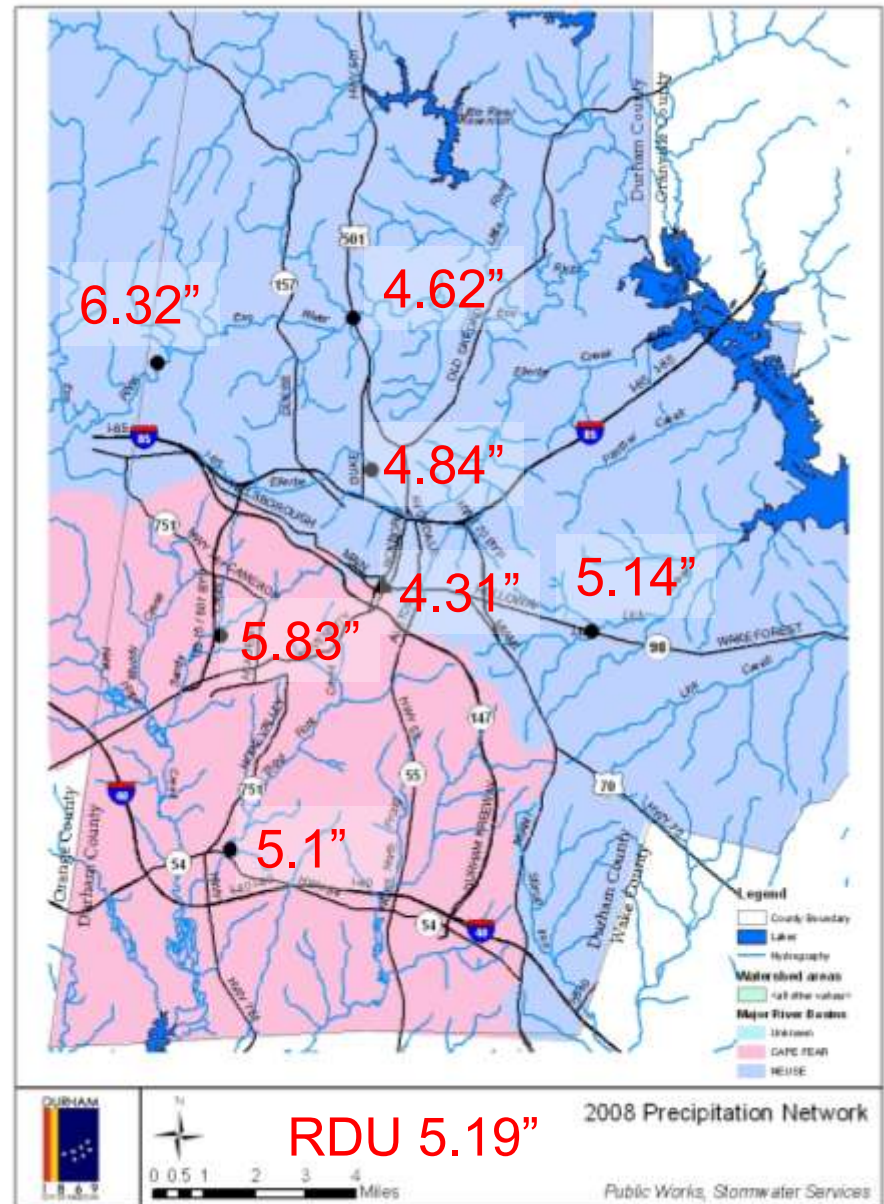
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# Precipitation network

- US Geological Survey & City
- 6 stations to monitor rainfall.
- Available on the internet

Tropical storm  
Hanna, Sept 5-6,  
2008





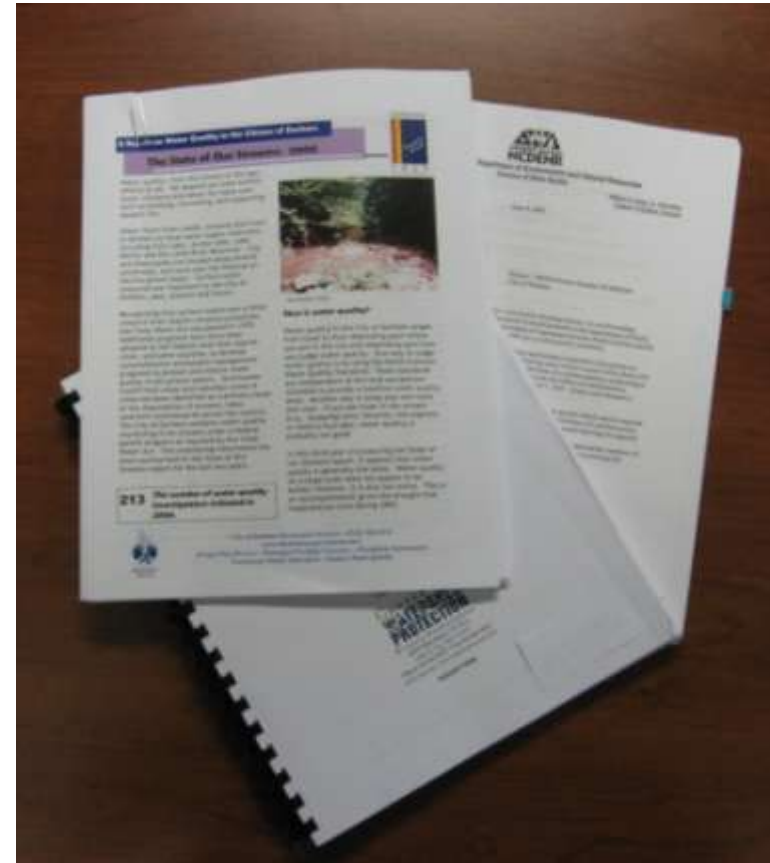
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# Annual reporting

- NPDES Annual Report and Program Assessment
  - Includes information from multiple departments
  - Submitted to the state
- State of Our Streams Report

[www.durhamnc.gov/stormwater](http://www.durhamnc.gov/stormwater)





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# The Water Quality Section

